National Institute of Environmental Health Sciences

Vulnerability to heat-related mortality in Latin America: A case-crossover study in Sao Paulo, Brazil, Santiago, Chile and Mexico City, Mexico

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Abstract:

Background Factors affecting vulnerability to heat-related mortality are not well understood. Identifying susceptible populations is of particular importance given anticipated rising temperatures from climatic change. Methods We investigated heat-related mortality for three Latin American cities (Mexico City, Mexico; Sao Paulo, Brazil; Santiago, Chile) using a case-crossover approach for 754 291 deaths from 1998 to 2002. We considered lagged exposures, confounding by air pollution, cause of death and susceptibilities by educational attainment, age and sex. Results Same and previous day apparent temperature were most strongly associated with mortality risk. Effect estimates remained positive though lowered after adjustment for ozone or PM(10). Susceptibility increased with age in all cities. The increase in mortality risk for those >Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 65 comparing the 95th and 75th percentiles of same-day apparent temperature was 2.69% (95% CI: -2.06 to 7.88%) for Santiago, 6.51% (95% CI: 3.57-9.52%) for Sao Paulo and 3.22% (95% CI: 0.93-5.57%) for Mexico City. Patterns of vulnerability by education and sex differed across communities. Effect estimates were higher for women than men in Mexico City, and higher for men elsewhere, although results by sex were not appreciably different for any city. In Sao Paulo, those with less education were more susceptible, whereas no distinct patterns by education were observed in the other cities. Conclusions Elevated temperatures are associated with mortality risk in these Latin American cities, with the strongest associations in So Paulo, the hottest city. The elderly are an important population for targeted prevention measures, but vulnerability by sex and education differed by city.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution, Meteorological Factors, Temperature, Other Exposure

Air Pollution: Interaction with Temperature, Ozone, Particulate Matter

Temperature: Extreme Heat

Other Exposure: apparent temperature

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Central/South America, Non-U.S. North America

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Morbidity/Mortality, Respiratory Effect

Cardiovascular Effect: Other Cardiovascular Effect

Cardiovascular Disease (other): cardiovascular disease mortality

Respiratory Effect: Other Respiratory Effect

Respiratory Condition (other) : respiratory disease mortality

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Children, Elderly, Low Socioeconomic Status

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified